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Assistant Professor of Philosophy, Cornell University

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THE JOURNAL OF PHILOSOPHY

FRANCIS BACON AND CONTEMPORARY PHILOSOPHICAL DIFFICULTIES

ALTHOUGH the writings of Francis Bacon are admirably perspicuous and full-freighted, our first impression is likely to be that of a man who never quite spoke himself out. The flow of precept and doctrine so often ceases before the end has been reached. Most of his writings are mere fragments. Yet better acquaintance usually leads to the conviction that our author's mind certainly was far from being fragmentary. Bacon everywhere speaks as though he knew his own intents to the uttermost. Never was man more sententious. His very figures of speech advance the argument with all of the precision of syllogisms. In the famous figure of the ant, the spider, and bee, for example, we have a compact and exact summary of the Baconian attitude, in its opposition to empiricism and to rationalism alike.[1] The epithets with which he belabors the schoolmen are not casual whipping-rods of speech; they are categories of criticism substantiated by bills of particulars. And if we consider larger matters, the unity of feeling that emerges as we study Bacon is truly astounding. Every word finally seems to be the expression of a single mind, and even of a single mood.

This effect of unity is unaltered even when we can trace the development of Bacon's thought, as for example in the elaboration of his doctrine of the Idols that beset the mind;[2] and it is not vitiated by the fact that as time passed the importance of collecting materials for a "true Natural History" began to overshadow his earlier interest in matters of method.[3] Bacon's writings are couched in the same key after a change of theme which, according to prevailing interpretations, can only be diagnosed as an admission of complete philosophical defeat. On every hand the Baconian philosophy has been identified with Baconian induction, and is taken to commit one to the use of those fantastic tables of presence and absence and degree he was at such pains to elaborate. Bacon him-

[1] The figure is expounded in *Novum organum*, I, xcv. (In quoting from Bacon I shall use J. M. Robertson (ed.), *The Philosophical Works of Francis Bacon* (London, Rutledge, 1905), whenever possible. The above reference is to page 288.)

[2] See Robertson, Index under the title "Idols."

[3] This has been shown by James Spedding. See his preface to *Parasceve ad historiam naturalem et experimentalem*, Robertson, 388–397.

self, however, was not of this opinion in the very treatise in which we find his view of induction most fully treated. In the last aphorism of the first book of *Novum organum* he writes as follows:[4]

> And now it is time for me to propound the art itself of interpreting nature; in which, although I conceive that I have given true and most useful precepts, yet I do not say either that it is absolutely necessary (as if nothing could be done without it) or that it is perfect. For I am of opinion that if men had ready at hand a just history of nature and experience, and laboured diligently thereon; and if they could bind themselves to two rules—the first, to lay aside received opinions and notions; and the second, to refrain the mind for a time from the highest generalisations, and those next to them,—they would be able by the native and genuine force of the mind, without any other art, to fall into my form of interpretation.

In this passage are named a number of things—a sound natural history, freedom from bias, restraint in generalization—which Bacon considers more essential to the success he desires than some particular formula of induction. As we shall see, the inductive tables appeal to him as a means of controlling the formation and use of hypotheses.

If Bacon had believed that the presentation of a new logic of induction was all-important, it is difficult to see why he left it in so incomplete a state. In *Novum organum*, II, xxi, nine subjects are specifically mentioned as requiring treatment. Of these only the first (Prerogative Instances) is there handled, while another (Preparations for Investigation) is dealt with elsewhere.[5] The remaining topics are nowhere discussed in Bacon's extant writings, nor is there any evidence that Bacon's thoughts on these subjects were ever committed to paper. Yet the precision with which they are tallied off suggests that they must have framed themselves rather distinctly in his mind. Nor would Bacon's logic have been complete even if these missing sections had been provided, and if all other missing parts of the Baconian induction had found utterance. These inductive procedures constitute but a part of the logical apparatus he intended to provide. They are but one aspect of the process of *interpreting nature*, which was to include also other non-inductive procedures, as the following passage from *Novum organum* indicates:[6]

> My directions for the interpretation of nature embrace two generic divisions; the one how to educe and form axioms from experience; the other how to deduce and derive new experiments from axioms.

[4] *Novum organum*, I, cxxx; Robertson, 301. *Novum organum* is, of course, a relatively late production, though Bacon seems to have worked on it perhaps as early as 1608.

[5] This is the *Parasceve ad historiam naturalem et experimentalem*, translated in Robertson, 402–412. This contains "the description and delineation of a Natural and Experimental History such as may serve to build philosophy upon."

[6] *Novum organum*, II, x; Robertson, 307.

The inductive tables fall under the first division, but so also do a variety of "ministrations" to the sense and to the memory, as likewise the whole doctrine of Idols. The second division was to include the whole reverse process of putting the preliminary axioms already found to further use in advancing knowledge. This process would not conform to the canons of Baconian induction.[7]

In the situation as Bacon viewed it, then, the so-called Baconian induction occupied a by no means central position. The focal point of Bacon's thinking is to be found in the conviction that nature must be interpreted rather than anticipated. The inductive tables themselves are referred to by Bacon as but one of the "helps of the understanding" in the interpretation of nature,[8] and these other aids are regarded by him as "more powerful" than the tables.[9] The need for interpreting nature as opposed to anticipating her is the unifying principle of the Baconian philosophy. This thread runs straight through his philosophical writings, and is their vital nerve. All phases of Bacon's thinking—the advancement of learning, the doctrine of Idols, the new induction, the need for a natural history, the attack upon past systems, even his practical maxims for the guidance of life—find common ground at this point. As we find suggested in the preface to *Parasceve,* practical considerations centering around the desire to win followers who should carry on the work no doubt decided him finally to direct most attention to that "ministration to the sense" which in *Novum organum* he called "the foundation of all," and which in the Plan of the *Great Instauration* he deemed so important that no amount of theorizing or argumentation, "no, not if all men's wits could meet in one," could hope to take its place. If a group of men could be found to gather the materials for a natural history in the proper spirit—in the spirit, that is, of interpretation as opposed to anticipation—these facts would in time be ana-

[7] It is, of course, true that Bacon often uses the word "induction," in a wide sense to include the whole process of interpreting nature, but when so used it must be distinguished from the narrower "Baconian" induction exhibited in the logical tables. And it is also true that *Novum organum,* which represents a relatively late phase of his thinking, is just the place where Baconian induction receives its most thorough development.

[8] *Novum organum,* II, xxi; Robertson, 327. This is one of the places where the two phrases "the interpretation of nature" and "true and perfect induction" are used synonymously. In the nature of the case the latter phrase can not here be used to signify the inductive tables only, since the tables are spoken of as being left behind while we proceed to other things also involved in "the Interpretation of Nature and true and perfect induction."

[9] *Novum organum,* II, xix; Robertson, 322–323. They are more powerful because they are capable of reaching "true notions of simple natures," a thing which Bacon holds is impossible through the use of the tables alone, even if we include the process of exclusions of which he was so proud.

lyzed satisfactorily by pure mother wit, even without the help of the new logic he had hoped to provide.

When the need of interpreting nature is made central to his thought, Bacon's philosophy gains greatly in clarity and force. This conviction furnishes a steady light by which his various fragmentary pronouncements can be read as expressions of a single mind. It also enables us to see them as programs of action rather than as dicta claiming metaphysical weight. They are calls to work rather than creeds. They aim not at "satisfaction (which men call truth) . . . [but at] operation."[10] Bacon is not a philosopher with a truth to tell us, but a man who wishes us to join him on a voyage of discovery.

The idea of a philosophy without metaphysical doctrines is so foreign to our creed-minded culture that it is likely to seem no philosophy at all. What are we to think of a philosopher who writes, "I have no entire or universal theory to propound; it does not seem that the time is come for such an attempt"[11]? Our bias towards metaphysics—an Idol of the Theatre which is shared by our religion and our science—makes it very difficult for us to understand Francis Bacon. When he speaks of Forms, for example, we are prone to interpret him in the metaphysical manner. It would be absurd to deny any metaphysical leaning whatever to Bacon, but in some instances the imputation would have to rest entirely on a matter of language. Thus in the first aphorism of the second book of *Novum organum* we find Bacon using a number of terms ancient to the philosophical vocabulary, and a pedant might possibly conclude that they figure significantly in his thinking; whereas it is the idea implicit in the juxtaposition and parallelism of the two sentences that constitutes the peculiarly Baconian contribution:[12]

> On a given body (*corpus*) to generate and superinduce a new nature (*naturam*) or new natures, is the work and aim of Human Power (*potentiae*). Of a given nature to discover the form (*formam*), or true specific difference (*differentiam veram*), or nature-engendering nature (*naturam naturantem*), or source of emanation (*fontem emanationis*) (for these are the terms which come nearest to a description of the thing) is the work and aim of Human Knowledge (*scientiae*).

This novel collocation of old ideas is a child of the same mind that found it possible to say that knowledge is power. That maxim is certainly more often quoted than understood. Bacon in uttering it was speaking with his accustomed brevity and precision. He was

[10] *Valerius terminus*, Ch. 9; Robertson, 194. *Cf.*, the Preface to the Great Instauration, the last paragraph: "It is not an opinion to be held, but a work to be done" (Robertson 247).

[11] *Novum organum*, II, cxvi; Robertson, 294.

[12] *Novum organum*, II, i; Robertson, 302.

asserting that there is a way of knowing the world—that is, a way of grasping it that is intellectually satisfactory—which is also capable of giving us control over it for the uses of daily life. By one and the same process the world can be rendered subservient both to the intellect and the will. By discovering the *forms* of things ("a name which I the rather adopt because it has grown into use and become familiar"), there results both "truth in speculation and freedom in operation."[13]

Great harm has been done to Bacon's meaning at this point by endeavoring to assimilate his notion of form to that of a law in science. A part of the content of the idea is modern, but in the end its foundation is scholastic.[14] Bacon took the scholastic concept of essence and interpreted it in dynamic terms. To the scholastic, essence signified "that whereby a thing is what it is," "the constant and necessary nature of a thing as contrasted with its accidents."[15] To Bacon, form means that whereby a thing acts as it does, the constant and necessary ground of its functioning. To the scholastic the idea of essence connoted a certain state of being, whereas with Bacon the necessary association of form is with activity. Accordingly, Bacon looks for what he calls "the freeing of a direction."[16] We wish by one and the same process to be advanced both intellectually and practically. We are reminded again and again that this is a single endeavor. Nothing is to be satisfactory that merely satisfies the mind; but on the other hand nothing is to be satisfactory that fails to satisfy it. We are not to content ourselves with barren rules; but it is for rules that we are looking.

What we desire both intellectually and practically is *certainty* and *liberty*. "Certainty is when the direction is not only true for the most part, but infallible. Liberty is when the direction is not restrained to some definite means, but comprehendeth all the means and ways possible."[17] On the side of action, a rule of operation which was certain would be bound to yield the result desired, while one which was free would not be limited to certain materials only, but would comprehend every possible material. From the intellectual

[13] *Novum organum*, II, ii, iii; Robertson, 303.

[14] Bacon is perfectly aware of the connection. In *Valerius terminus*, Ch. 11 (Robertson, 198), he tells us that the classic notion of form is a "swimming anticipation" of what he there calls "the freeing of a direction." *Cf. Advancement of Learning*, II (Robertson, 94). It may also be true that the notion of law in modern science has scholastic affiliations, though the connection would probably be more obscure.

[15] *Catholic Encyclopedia*, Vol. 5, 543; *Dictionary of Philosophy and Psychology*, Vol. 1, 341.

[16] I am following here both *Valerius terminus*, esp. Ch. 11 (Robertson, 195–199), and *Novum organum*, II, iv–ix (Robertson, 303–307).

[17] *Valerius terminus*, Ch. 11; Robertson, 196.

point of view, certainty demands a form which "is always present when the nature is present, and universally implies it, and is constantly inherent in it," while "it is always absent when the nature is absent, and implies its absence, and inheres in nothing else"; while freedom requires that the form be "such that it deduces the given nature from some source of being which is inherent in more natures, and which is better known in the natural order of things than the Form itself."[18] As Bacon points out, there is no formal contradiction between the demands of action and the demands of the intellect. It follows from the above, of course, that Bacon is no empiricist, in the sense in which empiricism has been opposed to intellectualism. Throughout his writings he opposes himself to a mere empiricism, and he always uses "science" to signify more than that collection of facts which was to be its foundation. Intrinsic to science for Bacon is the notion of intellectual mastery.[19] But while Baconian knowledge would conform to the strictest intellectualistic criteria, it would also possess a practical efficacy which the intellectually fastidious might regard as vulgar and irrelevant. Bacon nowhere disparages logic as such, though it is true that he was at pains to exhibit the shallowness of the ordinary logic,[20] and that he often vented his impatience and scorn upon a logic that is barren of consequences in action. He is equally vehement in the denunciation of undirected observation and experiment. It is "a broom without its band," "a mere groping as of men in the dark," "a labyrinth."[21]

At this point it is very important to be clear as to the kind of consequences in action to which Bacon chiefly directed himself. As he himself often puts it, he is after light rather than fruit. The haste to be practical is a great danger to be avoided. The word "use" seldom or never occurs in Bacon's writings without an earnest warning that the principal utility of knowledge from the point of view of human happiness lies in the further invention of arts and sciences. In a long and eloquent passage in the *Advancement of Learning,* for example,[22] Bacon enumerates the various worldly reasons for pursuing knowledge, and rejects them one and all.

> I do not mean, when I speak of use and action, that end before mentioned of the applying of knowledge to lucre and profession: for I am not ignorant

[18] *Novum organum,* II, iv; Robertson, 303.

[19] See the discussion in *Novum organum,* I, lxii–lxv (Robertson, 270–272) of the sophistical (rationalistic), empirical, and superstitious schools of philosophy. Bacon severely criticizes all three schools.

[20] *E.g., Plan of the Great Instauration;* Robertson, 250.

[21] *Novum organum,* I, lxxxii; Robertson, 281.

[22] *Advancement of Learning,* Book I; Robertson, 60. *Cf., Valerius terminus,* Ch. 1, 9; Robertson, 188–189, 194–195: Preface to the *Great Instauration;* Robertson, 245: *De Augmentis Scientiarum,* V, ii; Robertson, 510.

how much that diverteth and interrupteth the prosecution and advancement of knowledge; like unto the golden ball thrown before Atalanta, which while she goeth aside and stoopeth to take up, the race is hindered. . . . The end ought to be . . . to preserve and augment whatsoever is solid and fruitful; that knowledge may not be as a curtesan, for pleasure and vanity only, or as a bondwoman, to acquire and gain to her master's use, but as a spouse, for generation, fruit, and comfort.

In another place we are told that those who refer the sciences to action and use all too often "mean it of application of that which is known, and not of a discovery of that which is unknown." [23]

Bacon, then, wished to develop a logic which, while it satisfied every intellectual criterion, should also be useful in the course of actual human affairs.[24] The often raised charge, that his logic is without a rational basis, is therefore false, except to those who hold (perhaps with reason) that all rational enterprise finds itself in this predicament.[25] As Bacon himself saw it, his function was that of mediating between the contemplative and active sides of our nature. "I suppose that I have established forever a true and lawful marriage between the empirical and the rational faculty, the unkind and ill-starred divorce and separation of which has thrown into confusion all the affairs of the human family." [26]

Even after one admits the very close similarity of Baconian forms to scholastic essences, the fact remains that the notions differ in the important respect we have already indicated. Sound knowledge, Bacon holds, can only be delivered "in the same method wherein it was invented," [27] and a direction is but "superficial and counterfeit . . . if it do not carry you on a degree or remove nearer to action, operation, or light to make or produce." [28] In fact, "Who-

[23] *Filum labyrinthi,* v; Robertson, 208.

[24] Note how these two considerations are intermingled and seen as one in the following passage (*Valerius terminus,* Ch. 12; Robertson, 199–200): "The discovery of new works and active directions not known before, is the only trial [of truth] to be accepted of; and yet not that neither, in case where one particular giveth light to another; but where particulars induce an axiom of observation, which axiom found out discovereth and designeth new particulars. That the nature of this trial is not only upon the point, whether the knowledge be profitable or no, but even upon the point whether the knowledge be true or no; not because you may always conclude that the Axiom which discovereth new instances is true, but contrariwise you may safely conclude that if it discover not any new instance it is in vain and untrue."

[25] I have discussed the implication for logic of the fact that "mathematically ordered" systems of thought contain irrational elements in a paper entitled "The Organization of Thought," which was published in the Dewey memorial volume, 1929.

[26] Preface of the *Great Instauration;* Robertson, 246.

[27] *Advancement of Learning,* Book I; Robertson, 124. *Cf., Valerius terminus,* Ch. 6, Robertson, 191; Ch. 18, Robertson, 203.

[28] *Valerius terminus,* Ch. 11; Robertson, 198.

soever knoweth any form knoweth the utmost possibility of superinducing that nature upon any variety of matter.'' [29] The same can not be said of essence. A knowledge of the essence of a thing does not give us the power to produce that thing. This difference is crucial. It suggests that in a world which is conceived of as dynamic, knowledge itself must be conceived of as dynamic. The old familiar hierarchy of ordered things disappears, and its place is taken by a complicated moving series of interactions. These interactions are presumably just as knowable as the things, but there is this difference, that in knowing them we are placed in a position to change them. Knowledge enters the world of action, without loss of her ancient preëminence and importance.

It is worth noting that scientific laws are like scholastic essences in the manner in which the latter differ from Baconian forms. A scientific law is a generalized statement of natural behavior. It does not tell us how to get nature to behave that way. The laws of science were discovered through the use of certain methods, but these methods are seldom if ever communicated by the laws. The point is not so much that scientific laws usually state the asymptotes of behavior. That fact is true enough, and it raises serious questions; but that the laws do not tell us of what particular behavior they are asymptotic is a still more serious matter. It is as though the contours of the investigation were regarded as furnishing the occasion for framing the law, rather than as determining its content. Scientific laws are too far removed from factual conditions in statement, as well as in most cases in derivation and intent, to satisfy Bacon.

Bacon's point of view accords very closely with that enunciated in Bridgman's *The Logic of Modern Physics.* Bacon, however, is free from some of Bridgman's naïvété. Bridgman becomes terrified whenever he thinks that someone may call him a philosopher, and looks upon reasoning as a dangerous though necessary licence of the scientist. Bacon sees the same shortcomings and errors of the mind as Bridgman, but with greater depth and insight ascribes them to a faulty and barren logic. It is futile and unwise to disparage the intellectual powers of man; we must discipline them and put them to use. In other words we must turn the sciences into arts and make the arts scientific. According to Bacon an art is a way of doing, and of necessity involves a way of knowing; while a science is a way of knowing, and of necessity renders articulate a way of doing. Each is an indispensable moment of the other.

If what has gone before is in its broad outlines an accurate rendering of Bacon's views, it follows that he has been greatly misunderstood. The ground of this misunderstanding is not far to

[29] *Advancement of Learning,* Book I; Robertson, 96.

seek. It has been customary to interpret the philosophy of Francis Bacon in the light of the development of modern science. Because he so earnestly trumpeted a new order, he was regarded as in some sense the founder of the new order that came into being, and those things in his writings which most nearly accorded with what was understood to be its spirit were emphasized. Modern science had to make its way against the stubborn resistance of an intrenched philosophy, and therefore quite naturally either sought to differentiate itself very clearly from the enemy, or affected a contempt of all philosophy. Since the philosophy of the middle ages was Aristotelian, modern science found it necessary to be aggressively non-Aristotelian.[30] And since the most obviously Aristotelian part of the old logic is the doctrine of syllogism, the new logic must be non-deductive. Bacon's clarion call for a new science was understood in this setting, and he has accordingly been regarded as the philosopher of induction. So long as modern science continued to be regarded as primarily inductive in its method—and that means until about the time of Whewell so far as the philosophy of science is concerned—Bacon was regarded as its father. He was the leading intellectual inspiration of the English Royal Society and of the French Encyclopedia. Cowley in his famous ode "To the Royal Society" names Bacon as the man who finally freed captivated thought from its trammels:

> *Bacon* at last, a mighty Man, arose
> Whom a Wise King and Nature chose
> Lord Chancellor of both their Lawes;

while D'Alembert finds himself tempted to regard Bacon as "le plus grand, le plus universel, et le plus éloquent des philosophes."[31] In recent years, on the other hand, with the rise of new ideas regarding the nature of scientific method, it has been the custom of critics when discussing Bacon's methodology to agree with his editor, Ellis, "that the process by which scientific truths have been established can not be so presented as even to appear to be in accordance with it."[32] These critics therefore conclude that Bacon's program for the renovation of science is of no interest or importance to us.

This opinion is almost invariably based upon a quite natural complacency with the achievements of modern science. Science has given us a new world to live in, and in addition it has greatly enriched our minds. That we should respect the donor of these gifts

[30] It is not strange that modern science speedily developed a philosophy of its own. Merely negative positions do not provide rallying points for defence, much less foci for rational organization.

[31] D'Alembert, *Œuvres* (Paris, 1821), *Discours preliminaire de l'Encyclopédie*, Vol. 1, 63.

[32] R. L. Ellis, General Preface to the Philosophical Works; Robertson, 22.

is not surprising; but it does not seem right that the mind of man should become a vassal to its own creations. Even this magnificent structure is after all a human institution, and therefore subject to all the chances that affect human affairs. Human institutions grow not as they should but as they can, and incorporate into their structure much that a later time will find it expedient to alter or extrude. At any rate, even if Bacon's rejection of the prevailing scientific methods was ill-advised, it was intended. He specifically posed to himself the path actually taken by modern science, and would have none of it. The reasons he gives for his opposition are if anything more cogent today than they were three hundred years ago. The difficulties he raised are real difficulties still capable of puzzling us, and they must be faced and solved if modern science is to be founded as solidly as it deserves. The solution which recommended itself to Bacon may or may not be a feasible one, but in any event he carries us straight to the center of one of the most grievous intellectual problems of our time.

The crux of the difference between Bacon and the course taken by modern science lies in his attitude towards hypothesis. Since this is a matter of the first importance, it is worth going into in some detail. Bacon's position is not that we are to cease making hypotheses. We may make them and use them, but we are not to admit them to the body of science. Even more, we are not to build our science around and upon hypotheses. That the construction of hypotheses is legitimate according to Bacon can be shown in a number of ways. Thus in *Novum organum* he tells us that the understanding has permission,

> after the three Tables of First Presentation (such as I have exhibited) have been made and weighed, to make an essay of the Interpretation of Nature in the affirmative way; on the strength both of the instances given in the tables, and of any others it may meet with elsewhere. [33]

These essays or First Vintages, as Bacon calls them, when mentioned by commentators are usually regarded as fallings from empirical grace on his part. They are, as a matter of fact, an intrinsic part of his thinking. The manner in which hypotheses are to function is shown by Bacon's remarks at the beginning of his *Thema coeli* (Theory of the Heavens): [34]

> Seeing then that there are such difficulties on all sides, we must be content if something be asserted that is not harsh. I will myself therefore construct a Theory of the Universe according to the measure of the history as yet known to us; keeping my judgment however in all points free, for the time when history, and by means of history my inductive philosophy, shall have been further advanced.

[33] *Novum organum*, II, xx; Robertson, 323.

[34] *Thema coeli*, first two sentences; Robertson, 703.

The activities of the imagination are not to be excluded from scientific research; comparisons, analogies, and even guesses may be employed in the study of nature, but they are never to be considered a part of science.[35] The fifth part of the *Great Instauration* was especially provided to include things which Bacon himself had managed to discover without the use of his method; but these discoveries were to be kept separate, and not merged into the body of genuine science. Again, in the field of human relations Bacon recognized that a certain place must be reserved for "anticipation," if for no other reason "because of the conformity and participation of men's minds in the like errors." [36] The older forms of reasoning, with the philosophies and arts based upon them, will quite properly endure and "be in short like current coin, which passes among men by consent." [37] For such purposes Bacon is of the opinion that his philosophy will be of small use.

Finally and most important, Bacon develops very fully a doctrine of *Experientia Literata* or learned experience, which is to stand midway between mere undirected experimentation and the Interpretation of Nature. Under this heading practically the whole of our science and discovery would fall. Bacon describes it as hardly an art or a part of philosophy, but rather "a kind of sagacity" whereby discoveries are made by proceeding from experiment to experiment, whereas true Interpretation proceeds from experiments to axioms and thence back again to new experiments.[38] He makes it clear that literate experience will yield many discoveries, although the main hope of mankind lies in Interpretation,[39] and is even at pains to further its work by treating the methods of experimenting under some eight headings.[40] His suggestions are too detailed to be summarized here. They discuss the various ways in which new experiments are rightly indicated by experiments that have already been performed, without passage to axioms by that ascending and descending path which is so intrinsic to the Interpretation of Nature.

An excellent example of what Bacon wished to avoid in scientific study can be had by contrasting his remarks on memory in *Novum organum* with Fowler's footnote to these remarks in his edition of

[35] Bacon's own investigations into the nature of heat, reported on in *Novum organum*, II, xi–xx (Robertson, 307–327), as well as in numerous other places, furnish ample evidence of the propriety of using one's imagination in research. See also his remarks on Instances Conformable, or Instances of Analogy, *Novum organum*, II, xxvii; Robertson, 333–335.

[36] *Valerius terminus*, Ch. 15; Robertson, 200.

[37] *Novum organum*, I, cxxviii; Robertson, 299.

[38] *De augmentis scientiarum*, V, ii; Robertson, 504–505.

[39] *Novum organum*, I, ciii, Robertson, 290.

[40] *De augmentis scientiarum*, V, ii; Robertson, 505–510.

that work.[41] Bacon in discussing what he calls Constitutive Instances has occasion to list the various aids to memory, as, for example, order or distribution, artificial arrangements, rhythmic organization, contact with the senses, the stirring of emotions, the fixing of attention, etc. To Bacon these phenomena point to the need of further researches on the nature of memory, to such work, for example, as Ebbinghaus's classic and Herculean labors with nonsense syllables. Fowler's note to this passage looks in a very different direction. He says, "Most of the mental phenomena as well as the artificial aids to memory here described would now be explained by the doctrine of Association of Ideas." The myriad obfuscations of that hoary doctrine might have been avoided had students of human nature heeded Bacon's warning against the introduction of such anticipations of nature into their science.

Mathematical postulates constitute one of the most important kinds of hypotheses made use of by modern science. When we turn to Bacon's views of the nature and function of mathematics we find him most at variance with the spirit of modern developments. Scholars without exception have found him woefully deficient in mathematical wisdom. Thus in an able essay Broad tells us that "Bacon is paralyzed wherever he touches mathematics, pure or applied. He has no theory of mathematical reasoning."[42] It is, of course, true that Bacon was no practicing mathematician, and he nowhere displays the slightest intimacy with or detailed interest in the mathematical developments of his day, but with respect to the formal bases of ordered thinking his mind was extraordinarily clear—more clear, in fact, than that of most mathematicians until the comparatively recent present. This I shall try to show in a moment, but it is first necessary to point out that Bacon is not antimathematical.[43]

Bacon grants without question that mathematics must be employed in the preparation of the natural history for which he argued. Thus at one point he writes,

[41] *Novum organum*, II, xxvi; Robertson, 331–332. Thomas Fowler, Bacon's *Novum organum* (Oxford, 1889), 428–433.

[42] C. D. Broad, *The Philosophy of Francis Bacon* (Cambridge, 1926), 64.

[43] It has already been suggested that deductive processes have a proper place in reasoning, according to Bacon, though Baconian deduction differs greatly from that employed in mathematics. "La synthèse mathématique diffère tout autant de la déduction pratique de Bacon, qui n'est autre chose que l'application d'un principe trouvé à la production de faits nouveaux. Lorsque l'analyse du mathématicien a trouvé son inconnu, elle part de cet inconnu pour revenir sur ses pas et retrouver le connu; elle fait deux fois la même route en sens opposé, et les deux procédés succèdent consécutivement. La déduction pratique de Bacon regardait comme une frivolité de revenir à son point de départ; c'est qu'elle ne se propose pas d'enseigner des demonstrations, elle veut obtenir des production." Patru, *Esprit et methode de Bacon en philosophie. Bull. de l'Acad. Delphinale*, Grenoble, Vol. 4 (1856), 444.

Another precept is, that everything relating both to bodies and virtues in nature be set forth (as far as may be) numbered, weighed, measured, defined. For it is works we are in pursuit of, not speculations; and practical working comes of the due combination of physics and mathematics.

And at another point he holds that "Inquiries into nature have the best result, when they begin with physics and end in mathematics."[44] Bacon means by physics the inquiry into material and efficient causes. As a study it stands "in a middle term" between natural history and metaphysics, which inquires into formal and final causes. He is not opposed, then, to the use of mathematics in the study of nature; but he is opposed to the development of a mathematical philosophy. This leads him to recommend that measurements be relegated to the appendices of physics, rather than that they should appear in the body of that science. Mathematics and logic should be the handmaids of physics, and should not "presume on the strength of the certainty which they possess to exercise dominion over it."[45] We should look to mathematics only for statements of fact, and not for ingenious explanations. This is the fault that Bacon finds with Copernicus. His theories "are the speculations of one who cares not what fictions he introduces into nature, provided his calculations answer."[46] Bacon, in other words, was one of that group who felt "that the motions of the heavenly bodies should be traced to their causes, as well as reduced to rule."[47] He regretted the turn of events that had made astronomy one of the mathematical arts when it might have been accounted "the noblest part of Physics."

Bacon objects to the unrestrained use of hypotheses, whether these hypotheses take the form of mathematical postulates or scientific theories, on two general grounds. In the first place, too great reliance on hypothesis makes the advancement of learning depend upon private capacity or good fortune. Science must wait for its very growth and fruition upon the inspiration of an unpredictable happy thought. To the haphazard manner of development in the field of science Bacon contrasts the orderly progress of the mechanical arts. Here the whole process is kept out in the open, so that many wits contribute to one result, whereas in science and philosophy the wits of many are spent about the wit of one. Knowledge gained through Anticipations in large part is locked up in the discoverer,

[44] *Parasceve ad historiam naturalem et experimentalem*, Ch. 7; Robertson, 406: *Novum organum*, II, viii, Robertson, 307.

[45] *De augmentis scientiarum*, III, iv, vi; Robertson, 467, 475–477.

[46] *Descriptio globi intellectualis*, Ch. 6; Robertson, 685.

[47] W. Whewell, *History of the Inductive Sciences* (London, 1857), II, 99. As Whewell points out (I, 295–297, 388–390), Bacon was no dogmatic opponent of the Copernican theory. The difficulties he raised were in his day real difficulties, and were unanswerable until the telescope had been improved.

"because the mind working inwardly of itself, no man can give a just account how he came to that knowledge which he hath received."[48] Bacon stands foursquare for a communism of learned endeavor. The work of conquering nature through learning her secrets will require the concerted efforts of many men over a long period of time. At this point if at no other Bacon contributed an idea of the first importance to the development of modern science. No other thinker in early modern times makes so prominent the need of coöperative endeavor that lies at the very heart of science. So strongly did Bacon believe in scientific coöperation that the sixth and crowning part of his *Great Instauration*—that part for which all the rest of the scheme was developed—was set aside as the work of future ages.

As Bacon sees it, then, the indiscriminate use of hypotheses renders science esoteric at its very roots. That fault is a grave one, but it is even more serious that a science founded on hypothesis must run straight into a morass of scepticism and confusion. Such a science is without logical foundation, and can only be the parent of grave intellectual disorder, or as Bacon himself puts it:[49]

> The primary notions of things which the mind readily and passively imbibes, stores up, and accumulates (and it is from them that all the rest flow) are false, confused, and overhastily abstracted from the facts; nor are the secondary and subsequent notions less arbitrary and inconstant; whence it follows that the entire fabric of human reason which we employ in the inquisition of nature is badly put together and built up, and like some magnificent structure without any foundation.

The gravest fault that Bacon could point to in the developing structure of modern science was a logical one. Philosophy and the sciences, being products of the vagaries of man's mind, float in air. Our sciences in the end are nothing but conceits. Woven into them are many facts indubitably established, but the pattern itself is an unsupported whimsy of the mind. What we know and what we imagine are so intermingled that there is no possibility of separating the one from the other.

Bacon is pointing out that a science that centers around hypothesis necessarily becomes dialectical. It is driven to speak not about what is, but about what might be. It is unable to talk in simple declarative sentences, but must begin all its propositions with an "if." "If a given mass were concentrated at a certain point, and if that mass were suspended in a vacuum without friction from a given point by a support possessing no mass, then that mass if allowed to swing in a given plane through a sufficiently small arc will obey certain laws which are known as the laws of the pendu-

[48] *Valerius terminus*, Ch. 18; Robertson, 203.

[49] *Prooemium* of the *Great Instauration;* Robertson, 241.

lum." When a pendulum is so defined it ceases to be a natural fact and becomes an entity in logic. It can then be reasoned about, but it can not be exhibited. Bacon would have science deal with entities that can be both reasoned about and exhibited. As the following passage suggests, a science that deals with non-exhibitable entities in no essential respect differs from a religion: [50]

> The use of human reason in religion is of two sorts: the former, in the conception and apprehension of the mysteries of God to us revealed; the other in the inferring and deriving of doctrine and direction thereupon. . . . In the former we see God vouchsafeth to descend to our capacity, in the expressing of his mysteries in sort as may be sensible unto us; . . for the latter, there is allowed us an use of reason and argument secondary and respective, although not original and absolute. For after the articles and principles of religion are placed and exempted from examination of reason, it is then permitted unto us to make derivations and inferences from and according to the analogy of them for our better direction. In nature this holdeth not; for both the principles are examinable by induction, though not by a medium or syllogism; and besides, those principles or first positions have no discordance with that reason which draweth down and deduceth the inferior positions.

A science founded upon hypothesis, in other words, presents only the claim of faith to us with respect to its principles. We may believe the principles if for obscure reasons they appeal to us, but we are not entitled to regard them as statements of fact. Here the main point is not that the principles become suspicious, although, of course, they do; our uncertainty with respect to the foundations of knowledge infects the whole panorama of existence with doubt. The whole world of common sense tends to lose its validity, in favor of closed logical systems whose connections with matter of fact are tenuous and obscure. Some connection there must be—or at least that is the way we are forced to feel [51]—but it escapes demonstration. Bacon discusses this matter in the rather quaint setting of a criticism of the Aristotelian logic, and observes that the mere possession of principles or axioms is not sufficient to save us from scepticism, since we should still need to find the middle terms that would permit of their application to facts.[52] These middle propositions are indispensable in logic and in life, and in the nature of the case they must be declarative, e.g., "This *is* a pendulum."

We find a hopeless predicament of modern thought implicit in these criticisms of Bacon. Modern thought desires to render itself responsible to something outside itself—this is its inheritance from the past—and it is incapable of being anything but dialectical be-

[50] *The Advancement of Learning*, Book II; Robertson, 169.

[51] This necessity would no doubt disappear could we but lose our metaphysical-mindedness. In that event all systems of thought would become only games to play; but most people would not find them worth playing on such terms.

[52] *Advancement of Learning*, Book II; Robertson, 114.

cause it depends so irrevocably on hypothesis. The penetrating mind of Hume put the matter very nicely when he remarked of certain arguments that "they admit of no answer and produce no conviction."[53] This is the situation in which much modern thinking finds itself. Most contemporary logicians would agree that Hume's phrase excellently describes dialectical thinking, and many mathematicians now look upon mathematics in the same manner. Even in the field of natural science the great achievements have had a dialectical setting. This is the main significance of the work of the greatest scientists, including such men as Newton and Einstein. Their function is not so much to discover new facts as to systematize more fully facts already at hand. Beside their work, of course, there goes on, either with or without their help, the slow, patient Baconian endeavor to know nature. This endeavor is an intrinsic part of the scientific enterprise, but hardly a central element in the philosophy of science.

Modern thinking is thus stubbornly and inescapably dualistic. We are forced by our use of hypothesis to make a distinction between the realm of existence and the realm of meaning or dialectical possibility, between what Hume called matters of fact and the relations of ideas. And since most modern thinkers are too deeply bred in empiricism to believe that ideas are mystically transcendent, this dualism drives us to psychology for light on the nature of ideas. That science is yet too fragmentary to feed us anything but words. Thus the obligations of a faulty logic "do little else than make the world the bond-slave of human thought, and human thought the bond-slave of words."[54] The empirical world tends to become questionable, and opinions about whatever our opinions are about tend to take its place. We are forced to base our commerce with the actual upon an animal faith which, however strongly it may testify to our piety, is nevertheless fundamentally indefensible on rational grounds. We are believers in a secular revelation. As a matter of course, then, our dialectic is powerless to state itself rationally, since it is condemned to start from arbitrary irrational premises and proceed according to arbitrary irrational rules. The history of modern philosophy is thus a dreary record of man's unhappy and impotent state when the masculine and feminine parts of his nature—those faculties of (empirical) intuition and of (rational) poetic elaboration which Bacon wished to unite in holy matrimony—are at odds with one another.

[53] David Hume, *Enquiry Concerning Human Understanding*, Sect. XII, Part i. Hume made this remark about Berkeley; but he also makes it amply clear at other points that his own philosophy did not possess the power to win his own convictions. It too had only dialectical force.

[54] *Novum organum*, I, lxix; Robertson, 274.

The exasperating dualism of modern thinking might have been avoided had Bacon's counsels been heeded, and the foundations thereby laid for a truly universal philosophy. It is important to note that he took all knowledge for his province, and yet that he in no way belittled natural science. Bacon can not be called either a humanist or a naturalist. To him history includes both the history of nature and the history of man, and the former embraces among other things the history of arts.[55] Or as he once put it, "I consider history and experience to be the same thing, as also philosophy and the sciences."[56] That man is a part of nature is to Bacon perfectly obvious. Had his suggestions been heeded, the basis for a sound science of human nature might have been laid two hundred years before the pioneer psychologists of the nineteenth century, to the inestimable advantage of mankind. In his doctrine of universal perception he lays an ingenious foundation for the study of that complicated interactionism towards which modern thought is today so rapidly moving. This way of looking at man would have assimilated him to the rest of nature, and by obliterating an ancient dichotomy would have rendered human problems soluble on the same terms as the problems of inanimate nature:[57]

> A good explanation of the difference between Perception and Sense should have been prefixed by philosophers to their treatises on Sense and the Sensible, as a matter most fundamental. For we see that all natural bodies have a manifest power of perception, and also a kind of choice in receiving what is agreeable, and avoiding what is hostile and foreign. Nor am I speaking only of the more subtle perceptions, as when the magnet attracts iron, flame leaps toward naphtha, . . . and the like. . . . No body when placed near another either changes it or is changed by it, unless a reciprocal *perception* precede the operation. A body perceives the passages by which it enters; it perceives the force of another body to which it yields; it perceives the removal of another body which held it fast, when it recovers itself; it perceives the disruption of its continuity, which for a time it resists; in short there is Perception everywhere.

This is just a quaint way of telling us that we live in an extremely complicated world in which the lines of connection cross and recross so intimately that no one-way causal progression stands out except by arbitrary choice.[58] In a world of this character dialectical or-

[55] *Advancement of Learning*, Book II; Robertson, 79f.

[56] *De augmentis scientiarum*, II, i; Robertson, 426. *Cf. Descriptio globi intellectualis*, Ch. 1 (Robertson, 677): "Under philosophy I include all arts and sciences."

[57] *De augmentis scientiarum*, IV, iii; Robertson, 496.

[58] It is interesting that Bacon's ethical views are in consonance with this position. They may be summarily indicated by the following passage from the *Advancement of Learning*, Book II (Robertson, 134): "There is formed in every thing a double nature of good; the one as the thing is a total or substantive in itself; the other, as it is a part or number of a greater body; whereof the latter is in degree the greater and the worthier, because it tendeth to the con-

ganization under the control of hypotheses or postulates becomes inadvisable, and a search for what mathematicians call *functions* becomes all but necessary. Bacon himself may have had small insight into the detailed nature of the new science that would have developed had his principles been followed, but he deserves his meed of credit for having so wisely pointed out the way which science is today at last painfully discovering that it must take if it is to escape the obfuscations that threaten it.

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BOOK REVIEWS

The Present and Future of Religion. C. E. M. JOAD. New York: The Macmillan Company. 310 pp.

"All religion," Santayana has remarked, "is positive and particular," by which he meant to imply that its generic dimension is discovered, if at all, in characteristic activities like myth-making, calendar-celebrating, or shrine-attending rather than in a program of inerrant good universally admirable. Hence the author of a book with this title would have to be concerned with the career of such techniques or guilty of generalizing from his analysis of a specific religion. The discovery that he is speaking, for the present, of the Anglican Church and is anxious for the success in the future of certain social and "spiritual" ideals, conceived by himself as inherently religious, would be a sufficient deflation. A more persistent reader, however, might easily conceive the contents of this book as organized really around three cardinal antipathies of the author: the Church of England itself (especially in its Evangelical and Anglo-Catholic expressions), the genetico-psychological (particularly the Freudian) explanation of human behavior, and the excesses of mob humanity (as discovered notably in war-madness and democratic politics).

An acquaintance with Mr. Joad's previous output, versatile and voluminous, discloses him as a latter-day Sophist in the best English tradition of urbane writing. One would not seek to deprecate his production of miscellaneous reflections were it not for the present congeries. This book is not concerned with the present and future of religion in any comprehensive sense, nor even with a consideration of the practicality of undertaking such a study. Though Joad professes his treatment to be that "neither of a believer nor of a sceptic, but of an absorbed spectator" (p. 5), his valuable discus-

servation of a more general form." He uses this notion to criticize Aristotle's contemplative life as a mere way of private gratification.

sion of the present vicissitudes of the Anglican Church, in the first half of his book, is blurred by an obvious Modernist bias. Moreover, his observations on the general character of religion, preliminary to outlining its future, are rendered immediately suspect by virtue of his flat assumption that "the fundamental tenets of all the great religions bear a strong family likeness; to all intents and purposes, indeed, most of them are the same" (p. 127). This myopic approach is enhanced by a philosophic predisposition in terms of which, rather than out of the materials of his analysis, he chooses to read religion's future. Numerous divagations interesting enough in themselves, help add to the confusion. Such books as his, no less than veiled apologetic literature or the pasquinades of a Mencken, tend gratuitously to embarrass the efforts of more conscionable students of religion whose ambition is free and unattached analysis. His study gives regrettable point to Professor Dewey's recent observation that "the great solicitude of many persons professing belief in the universality of the need for religion, about the present and future of religion, proves that in fact they are moved more by a partisan interest in a particular religion than by interest in religious experience."

Mr. Joad has marshalled impressive statistical data on the paucity of church-goers, the increase of indifferentism, the difficulty of recruiting students for the ministry. From these facts he concludes that organized Christianity (or at least the Established Church of England to which his attention is really confined) is breaking up. On the other hand he finds religious literature enjoying a wide popularity and a lively current interest in religious questions. It is this seeming paradox which he is concerned to analyze.

The drift from the churches he attributes to three prime causes whose importance is doubtless inverse to the order of his treatment: the disintegration of the Church itself, the impact of science, and the "spirit of the age."

The disintegration within the church is apparent in the existence of three parties continually squabbling over theological peccadillos. The Anglo-Catholic faction covets Roman Catholic verve, and the recent excitement in this country over tactile succession is duplicated in England over the problem of the reserved sacrament. This "clerical fiddling while Rome burns" is a symptom of the Church's remoteness from vital concerns at the same time that it speeds the growing alienation of sensitive and intelligent devotees.

The rôle of evolution is rehearsed in its thrice-familiar havoc. Modern man is said to have developed an increased respect for "evidence" which eschews, for example, witch-hunting on the one hand and assent to a naïve cosmology, on the other. The influence of the

new science, and more particularly the scientific way of thought, is doubtless great, but doubtless here, as usual, greatly exaggerated. "So far as present indications go," avers Mr. Joad, "it seems not unlikely that science will deliver the *coup de grâce* to organized Christianity within the next hundred years" (p. 72).

The "spirit of the age" is the term which covers the complex picture of our generation in its revolt against Victorian standards, abetted by the new psychology and confirmed by the post-war disillusionment. Psychoanalysis, revealing our actions to be determined by subterranean impulses beyond our governance, has eventuated in a practical fatalism, radically antipathetic to religion. The accommodation of religion to the horrors and duplicities of the war has increased the disrespect for its authority. "The belief in the efficacy of the unconscious has combined with the disbelief in the efficacy of God to abolish ethics" (p. 115). "For the first time in history there is coming to maturity a generation of men and women who have no religion, and feel no need for one" (p. 121).

Having affirmed that the growing generations feel no need for religion, he proceeds to elaborate the contradictory insistence that the need for religion is a "fundamental fact of our natures." He might well have pursued a more fruitful line by attempting to search out the multifarious substitutes offered by our resourceful society for aspects of the traditional configuration. He has already written two books called *Thrasymachus or the Future of Morals* and *Diogenes or the Future of Leisure*. Perhaps he will some day write a book which, dealing with the fractured realignments of the religious pattern in the Western society of our day, he might wish to entitle, after Henry Adams, *Dynamo or the Future of Religion*. In that putative book he will not be so much concerned with the origin, evolution, and ideal fulfillment of religion as with discerning the implications for our society of its accustomed functions being so variously usurped. He might wish to touch on the secularization of morals. the radical transference of faiths, the variety of rival ways of achieving social outlet or satisfying the worshipful. If he were to expand on a salient feature of the religious picture which he here ignores—its mythological structure—he might find men turning more and more for a terrain in which their imagination may roam either to the cosmos which modern physics and astronomy reveal, or, if their taste is more literary (but not less romantic), to those vivid and intimate worlds to which novelists like Mann, Galsworthy, or Proust, practitioners of the most popular mode of modern art, have invited us. He would remark too how, just as in the Middle Ages, what Santayana calls the "Christian epic" took concrete sensuous form, for the less disciplined minds, in bas relief or fresco,

so today a notable novel is pictorialized at Hollywood or cut in strips for the tabloids. And in the end he would doubtless find the peculiarly beneficent, socially and artistically ramified religious mythology still taking, for persons like himself, a place of precedence.

His prognosis would then emerge out of the resources of this set-up rather than out of the germs of religion's speculative past. The future pictured would then be the realizable entelechy of present trends rather than the conformance to those ideal conditions which, according to his prescription, Christianity must regain or the religion of the future must possess. These he here sets forth as twofold, following the Catechism: a vital political impulse or our duty towards our neighbors, and a genuine mystic inspiration or our duty towards God. "Our relation to the first in what I shall call its religious aspect consists simply in our duty to make it better; our relation to the second in our endeavor, and the endeavor through us of life as a whole, to know it and, it may be, to evolve at a level at which we may enter into communion with it" (p. 197).

Because of the vacuum created by the desuetude of traditional religion, because of the warping of the individual in the vast corporate life of the modern state and the chaos of his social activities, the challenge to harness and integrate these random energies confronts the religion of the future. Though he negates most of their ideals, the spirit which animates Bolshevism and Fascism commends itself to him as to Bertrand Russell. He places little faith in the Christianity which he knows for the attainment of these, his valued ends:

"So far as political ends are concerned I am an old-fashioned Liberal in the wide, a Socialist in the strict sense, regarding liberty and equality, freedom for the expression of every variety of thought and every shade of opinion, and a respect for the rights and the privacy of the individual as paramount social goods. On the economic side I desire to see an equal distribution of material wealth, and would rank myself a supporter of Shaw's programme of equal incomes for all, irrespective of services rendered to the community. Of these social ends which I hold to be valuable, one only, that of equal distribution of material goods, seems to be held in honour in Bolshevik Russia, and even this seems to be less, rather than more, likely to be realised as Bolshevism settles down" (p. 230).

Admiring in Christianity chiefly the sense of social responsibility, he is forced to see its superior realization in the corporate political movements of Russia and Italy. Whether or not the latter are regarded as essentially religious phenomena, the task remains to see this aspect of their activity as part of a larger *gestalt* which, in its numerous parallels to the conventional religious pattern, might well bear further analysis.

As respects the more private aspect of the religious compound, Joad concurs with his compatriot, Professor Eddington, in basing it upon that lifting collusion with a chiefer being by which mysticism, in our culture, is usually denoted. For Eddington, himself a devout Quaker, and, by profession, inured to the cosmic vastness and the abstraction of its mathematical exploration, such an emphasis is not puzzling. For Mr. Joad, by his own admission untouched by mystic illumination, and by the evidence of this volume a friend to the intellectualistic position typified by Dean Inge and Bishop Barnes, a principle of explanation is harder to find. It is evidently part and parcel of that literalistic platonic disposition elaborately disclosed in his recent *Matter, Life, and Value*. There is, for him, over and beyond this world, a realm of value, glimpses of which occur in esthetic rapture or ethical insight. To the mystic they occur whole, direct, and inexpressible. To attain to such insight is the *terminus ad quem* of the evolution of the human species. Hence, in so far as religion becomes more mystical and human experience, in this sense, more religious, is the race admirably fulfilling its destiny.

Mr. Joad is to be thanked for helping us to understand the struggles of the Anglican Church. He has routed those contemporary psychologists who suppose that once they have exposed the roots of religion it is no longer a tree of life to them that lay hold of it. He is alive to the ineptitude of a purely intellectual appeal, but he makes no attempt to show the inter-relation of those political and mystical trends which seem exhaustive to him.

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Coleridge as Philosopher. JOHN H. MUIRHEAD. (Library of Philosophy.) New York: Macmillan Co. 1930. 287 pp.

As Professor Muirhead states in his preface of *Coleridge as Philosopher*, this work was intended to be one of a series of studies on the History of British and American Idealism and to form a connected view of the Platonic tradition from the seventeenth to the nineteenth century; but the original scope was enlarged in order to show at the same time the work in philosophy Coleridge actually completed. That Coleridge represents a development of idealistic philosophy in England of far greater importance than is commonly accepted, Professor Muirhead has long maintained. Since no scholar in philosophy of his superior gifts has ever attempted to make an extended analysis of Coleridge's philosophical writings, this book becomes at once important by the force of its authority. Many brief treatments—most of them are better called mere sketches—of Coleridge's influence on philosophy exist; but they largely express

a futility of being able to classify it clearly, and not a few of them are quite mute in their indicating any idea of its position in the history of English thought in the nineteenth century. Disregarding the myths that have grown up around Coleridge and his philosophy, Professor Muirhead with his well practised mind in metaphysical research rescues his subject from most of the misconceptions that have persisted all too many years. The principal criticism directed toward Coleridge is that he had no defined system, and that which might be drawn from his writings is too incoherent and fairly buried in verbiage. Granting that he often loses himself in mazes of speculation that are beyond any designed purpose, there is to be found, despite this general fault, a more translatable system than is ordinarily understood. The incomplete state of his writings, both published and unpublished, renders also the task of any critic much greater; manifestly, however, this has not deterred Professor Muirhead from not only giving an analysis of what Coleridge attempted in creating a basic philosophy, but also an appreciation of what influence this had in its relation to his treatment of nature, science, ethics, esthetics, politics, and religion.

Professor Muirhead's work has been considerably enhanced in originality and significance on account of his being able to examine unpublished remains of Coleridge's philosophical writings, some of which fortunately contained proofs of his belief gathered from the published ones that "as a stage in the development of a national form of idealistic philosophy his [Coleridge's] ideas are far more important than has hitherto been realized either by the educated or by professed students of the subject." That a large mass of Coleridge's writings still remains unpublished is well known to students of him to-day, though his critics and biographers of the past have largely overlooked this material. If there had been an intelligent effort made to study these manuscripts after they had been neglected or ignored by his principal editors following his death, there would not be now persisting the general belief that he spent the last twenty years of his life talking, or that the only work accomplished was of fragmentary nature. It is true that what he planned to write in his last years would have taken perhaps another life-time or two to complete; but if he did not write his Epic, or finish his Logic or the Magnum Opus which was to revolutionize "all that had been called Philosophy or Metaphysics in England and France since the era of the commencing predominance of the mechanical system at the restoration of the second Charles," he did complete enough of the two latter projects to have a new appraisal made of his industry as well as a better understanding of his works. The popular fallacy of his being a mere visionary should be somewhat adjusted as soon as

the editing of his manuscript remains, now under way, is completed and published.

The book is chiefly outstanding for its chapters on Coleridge's Logic, Metaphysics, and Philosophy of Religion, although this selection does not seek to minimize the importance of the exceptionally interesting ones on his philosophical development and his Moral and Political Philosophy. The chapter on the unpublished Logic demands more attention, however, because of its relation to Coleridge's idea of working out a system in metaphysics, or philosophy in its widest meaning. This grand project had to be preceded by a system of logic and with a consideration of its effect in the sciences, politics, law, religion. As a foundation for his *Opus Maximum* it sought to clarify the scientific treatment of the functions of thought and define the limits of the science of logic. That he was quite aware of the futility to develop postulates and principles in logic which could be used separately from philosophy, he acknowledges at the beginning of his undertaking. *Noetic*, or the Science of Nous, is the ultimate in thought, he knew; but he believed that logic as the science of *logos* could be developed as other sciences; that is, its thought, regardless of its truth in the end, is not dependent on its object. He does not go beyond the traditional reasoning in this field; but he comes to the conclusion that if merely analyzing a syllogism is all that logic signifies then it is only "a hollow science." One strikingly original note, Professor Muirhead observes, is that Coleridge treats of logic in its relation to psychology. He saw, though only dimly, the connection between apperception and inference—a fact which has changed both modern logic and psychology. If he had not been too greatly hampered by classical modes of logical thinking, he might have developed his idea that "the main object of logical investigation is most often the establishment of the object itself, which, when once established, contains, or rather is coincident with its influences," and "not only must we have some scheme or general outline of the object, to which we could determine to direct our attention, were it only to have the power of recognizing it, or, as the phrase is, bring it under our cognizance when perceived; but the very senses by which we are to perceive will each again require the aid of a previous scientific insight."

The second part of the unpublished Logic contains the first exposition in English philosophy of Kant's logic in his *Critique;* but Coleridge has made no original contribution to it, except in his refusal to follow Kant's assumption that there was no plane of thought beyond the transcendental analysis, or as Coleridge reasons, "considered as Logic it is irrefragible, as philosophy it will be exempt from opposition, and cease to be questionable only when the soul of Aris-

totle shall have become one with the soul of Plato, when the men of *Talent* shall have all passed into the men of *Genius*, or the men of Genius have all sunk into men of Talent. That is *Graecis Calendis*, or when two Fridays meet."

That Coleridge's philosophy has its foundation in his theology is a statement only too easily made by the reading of his works, and it is one that Professor Muirhead fully recognizes in his discussion of Coleridge's Metaphysics. Coleridge declares that "the doctrine of Ideas is antecedent, but only because ancillary, to the more important truths, by which religion rises above philosophy," yet if his theological dogma is too often more strongly assertive than his philosophical doctrine, there is always the one dominant aim in his efforts—to establish a metaphysical basis of his system. He was only perpetuating a philosophical heritage in linking religion with philosophy, and his connection to the Neo-platonic school is obvious, especially in reference to the theory of the Trinity. His vast reading in the "Platonizing divines," as he calls them, Leighton, Baxter, Hooker, and Taylor, was an effort to get a historical view of the Trinitarian idea of the Church as well as to use it in his own beliefs. In this search for evidences of "eternal truths," he, of course, more than often loses himself in theological dogmas, and saves himself only from submergence in them by his determination to show that in Christianity was the true explanation of the spiritual mind. Since it is a great question whether he ever intended to make a separation of theology and philosophy, it is difficult to make a sharp distinction between them as he conceives the two. He has called philosophy, *theognosy*, for in a knowledge of God all knowledge is possible. In view of such a conception theologians may be justified in approaching his speculations from a Biblical or Christian angle, though they fail to interpret him on a basis of purely philosophical terms. The philosopher must take his expression *Absolute Will* instead of *God as Being*, since in the *Will* may be found the springs of experience and reason. The attainment of the idea of God through religious experience must give over to scientific experience; the supreme reality can not be obtained through sensory or logical process, but it must be established in the same manner as other knowledges, e.g., mathematics. He writes in one unpublished manuscript: "I look around in vain to discover a vacant place for a science, the result of which is to the knowledge and ascertainment of God, i.e., of the reality and existence of the Supreme Being in the absence or rejection of the idea as the Datum, and the result anticipated and precontained in the premise." His religion had to be justified through philosophy, but it must be worked out by practical reason and not by pure speculation. As reason is "the source

and substance of truths above sense," Coleridge demands that in the contemplation of God man should rid his mind from sensory forces. Plato reasoned that before truths in metaphysics can be determined man's mind must be made independent of the senses through the discipline of geometry, thus in like manner does Coleridge believe that the initial step towards a religious or philosophical truth is to ignore the concrete and visible.

Professor Muirhead's examination of Coleridge's writings has contributed to a fuller understanding of the poet philosopher's position he must hold in the history of Anglo-Saxon idealistic philosophy. To Coleridge must be assigned the credit of first realizing the impotency of the spiritual thought of his day, and his ability to give expression to what was only vaguely felt in making religion and philosophy more practical places him as a forerunner of the revival of metaphysical study in the nineteenth century. Since his time, no thinkers in idealistic philosophy can quite escape his insistence on God as Will, for on this one dictum is the basis of most of their writings. In him also was conceived the idea of Personeity, or that "personal being, having the *causi sui,* or ground and principle of its being, in its own inexhaustible causitive might." Professor Muirhead believes that Coleridge anticipated in his interpretation of this idea the best that later idealism has to give on the subject. In the field of psychology of religion he stands unique. He had grasped what psychologists have only begun to see in recent times.

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Textbook of Logic. A. WOLF. New York: Macmillan Co. 1930. Pp. xiv + 323.

Without doubt there are many who think it still possible to teach the traditional logic in the traditional way. And, indeed, compactness and a real wealth of new illustrative material is a dignified achievement in itself. Among books of this class the present work is a real competitor to the famous one which Jevons wrote so many years ago. From so many sources of new light that belong to our own day hardly a ray falls to illuminate these matters that are old. But should not the teaching of science keep pace with its advance? Must not the teacher of a tradition interpret that tradition whole? Should our "new" student discuss these matters with his "old" tutor their argument might run like this:

Student: If it is true that a is a class and b is a class does it follow that what is a and b is a class?

Professor: That depends on whether a and b have objects in common.

Student: In the contrary case why not say that what is a and b

is an empty class? That would be so convenient, because then we could substitute in our formulas not only "single" classes but "products" of classes as well. But tell me, this "universe of discourse" to which you refer in the text and which is made up of any class and its negative, is this universe a class?

Professor: Yes, I should think that it is.

Student: Then what would its negative be? You see, while letters like *a, b, c,* occur in our formulas, their negatives sometimes occur too. I should like to know what to substitute for non-*a* when *a* becomes universe.

Professor: I see you are trying to make me accept your newfangled notion of an empty class. I shall lay it down as a rule that no class or its negative can become as large as the universe.

Student: That limitation seems to me to destroy the generality of the science.

Professor: It covers the cases that occur in practice. But even *Principia Mathematica* does the same sort of thing when it says that its variables are limited to "propositions."

Student: An appeal to authority, however distinguished, is still an appeal to authority. But tell me, how would you interpret *celarent* for the case in which the major and minor terms become contradictory as a special case? Let us write it out on the board.

Professor: I should say that the inference is true but not valid (*Textbook of Logic,* p. 6).

Student: Yet *celarent* is called a valid mood of the syllogism. How would you interpret the same mood when the terms in the major premise have been identified. Let's write that out too.

Professor: That has a queer look. Perhaps I should have to say that the terms in the syllogism must remain distinct.

Student: Another limitation with a corresponding loss of generality. I was going to ask you to give up that distinction of "true but not valid" and allow me to call the major a null proposition in the case supposed. Then the consequent would "follow" since the antecedent is absurd.

Professor: But that is not what we mean by inference.

Student: May it not be that we shall have to generalize the meaning of inference, just as the mathematician does when he redefines quantity so as to include the case of imaginaries? May it not be that this is what inference will have to *come* to mean?

Professor: I am afraid that you are going to "reform" the science out of existence.

Student: If there is no other way we can only try and see. The ancient science cries for reform and half measures will hardly be of much avail.

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JOURNALS AND NEW BOOKS

REVUE PHILOSOPHIQUE. 56 Année, Nos. 3 et 4. Contruction sociale du Droit: *E. Lévy.* Paul Lecène: *Ch. Blondel. Homo faber et homo loquens: P. Lecène.* Les opérations du jugement judiciaire: *F. Gorphe.* Remarques sur le plaisir et la douleur: *M. Latour.* Le langage: *A. Ombredane.*

REVUE DE METAPHYSIQUE ET DE MORALE. 38 Année, No. 1. Antihistoricisme: *B. Croce.* Le parallélisme absolu et la théorie unitaire du champ: *E. Cartan.* De la vraie et de la fausse conversion (suite): *L. Brunschvicg.* Le libre arbitre et l'attention selon saint Thomas: *J. Laporte.* Sur deux objections usuelles contre l'idéalisme absolu: *R. Le Senne.*

Cohen, Morris R.: Reason and Nature. An Essay on the Meaning of Scientific Method. New York: Harcourt Brace & Co. 1931. xxiv + 470 pp. $5.00.

England, F. E.: Kant's Conception of God. A Critical Exposition of its Metaphysical Development together with a translation of the *Nova Dilucidato.* With a Foreword by G. Dawes Hicks. New York: Lincoln McVeagh. The Dial Press. 1930. 256 pp.

Gentile, Giovanni. La Filosofia dell'Arte. (Opere Complete di Giovanni Gentile.) Milano: Fratelli Treves Editori. 1931. viii + 377 pp.

Overstreet, H. A.: The Enduring Quest. A Search for a Philosophy of Life. New York: W. W. Norton & Co., Inc. 1931. xii + 277 pp. $3.00.

Smart, Harold R.: The Logic of Science. New York: D. Appleton & Co. 1931. v + 237 pp. $2.50.

NOTES AND NEWS

The First International Congress for the Psychology of Religion will be held in Vienna, May 25–30, 1931, under the auspices of the International Society of Religious Psychology. The chief topic for discussion is: The mental causes, contexts, and complexes of unbelief. Programs and information concerning accommodations may be secured from Dr. Karl Beth, Zitterhofergasse 8, Wien VII, Austria.

Paul Weiss is resigning his position as instructor and tutor at Harvard University at the end of this semester, to become an associate at Bryn Mawr College.